

Calcium and vitamin D in post menopausal women

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ABSTRACT

Calcium and Vitamin D are widely used therapies for Osteoporosis. Vitamin D is not a vitamin in true sense since it is produced in response to the action of sunlight on skin. Vitamin D has multiple roles in the body, not all of them well-understood. Vitamin D supplementation must be considered a form of hormone replacement therapy. Therefore it raises all the questions about efficacy, dose, and side effects. The Efficacy of use of Calcium and Vitamin D in all post menopausal women in terms of the prevention of fracture is uncertain. The Annual worldwide sales of these supplements have been several billion dollars. The variation of the results from various studies of Calcium and Vitamin D supplementation in elderly women suggest that benefit of calcium plus vitamin D on bone mineral density or the risk of fracture is small and may vary from group to group and baseline Vitamin D status. Women taking supplemental vitamin D and calcium have a statistically increased incidence of renal stones, according to evidence from the Women's Health Initiative. Studies have shown association between calcium use and increased risk for cardiovascular disease. In a recent review of evidence from 6 randomized trials evaluating the use of vitamin D and calcium to prevent fractures in postmenopausal women who are not living in a nursing home or other institution, the United States Preventive Task Force (USPTF) found no evidence of a benefit from supplementation with 400 IU or less of vitamin D3 and 1000 mg or less of calcium. Also in a report from institute of Medicine Committee, there was insufficient evidence, particularly from randomized trials, that vitamin D treatment affected the risk of non skeletal outcomes like risk of cancer, cardiovascular disease, diabetes, infections, autoimmune disease, and other extra skeletal outcomes.

Key words: Calcium, post menopausal women, Vitamin D

INTRODUCTION

Calcium and Vitamin D are the most widely used therapies for Osteoporosis.

The Efficacy of use of Calcium and Vitamin D in all post menopausal women in terms of the prevention of fracture is uncertain. Use of calcium and vitamin D supplements is very common, with more than half of postmenopausal women taking them. There is a huge industry supporting the practice. The Annual worldwide sales of these supplements have been several billion dollars.^[1]

16 randomized controlled trials have studied the effect of vitamin D supplementation, with or without calcium, on fracture risk. These studies vary considerably regarding their test populations and dose of vitamin D. In 6 randomized trials of average-risk individuals, supplements failed to significantly reduce the risk for fracture. Also, the use of vitamin D alone without calcium was not found to reduce the risk for fracture.

Calcium may be less effective in preventing bone loss in women who have recently undergone menopause and at sites rich in trabecular bone. The effect of calcium on the risk of fracture is less clear.^[2,3]

The doses of 400 to 800 IU per day vitamin D have little effect on bone mineral density, except among subject who have a deficiency of vitamin D.^[4] The variation of the results from various studies of Calcium and Vitamin D supplementation in elderly women suggest that benefit of calcium plus vitamin D on bone mineral density or the risk of fracture is small and may vary from group

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to group and baseline Vitamin D status. Women taking supplemental vitamin D and calcium have a statistically increased incidence of renal stones, according to evidence from the Women's Health Initiative. For every 273 women who received supplementation during a 7-year follow-up period, 1 woman was diagnosed with a urinary tract stone.^[5]

Jackson *et al.* reported results from the Women's Health Initiative (WHI) calcium plus vitamin D trial.^[5] The investigators of the trial randomly assigned more than 36,000 postmenopausal women between the ages of 50 and 79 to receive 500 mg of elemental calcium as calcium carbonate with 200 IU of vitamin D₃ twice daily or matching placebos for an average of seven years. Annualized rates of hip, total, and site-specific fractures were compared between the groups. Calcium with vitamin D supplementation increased total-hip bone mineral density by 1 percent as compared with placebo. According to an intention-to-treat analysis, there was no significant effect of calcium with vitamin D supplementation on any of the fracture end points. Calcium with vitamin D supplementation increased the risk of renal calculi by 17 percent.

A meta-analysis published in British Medical Journal 2011 suggests an association between calcium use and increased risk for cardiovascular disease.

The Endocrine Society focuses on the population from the perspective that most of the population is vitamin D deficient, whereas the Institute of Medicine takes the view that most people receive the proper amount of vitamin D.

Unlike drugs, nutrients do not result in a linear response, and if the patient has adequate vitamin status giving more will have no effect. Nutrients are unlike drugs. Once an adequate concentration has been achieved, additional intake has no effect.^[6]

Most of the randomized, controlled trials of vitamin D that have been published to date have paid little attention to baseline status.

The significant issue regarding adequacy of dose of Vitamin D was specifically addressed by Bischoff-Ferrari *et al.*, who used individual adherence data to modify the assigned dose.^[7] They found that fracture risk was reduced only among persons who were given doses of 800 IU per day or higher of Vitamin D. This observation would be more informative if it were accompanied by data on the baseline concentration and induced change in the level of 25-hydroxyvitamin D. Only few of the included studies provided this information.

In a recent review of evidence from 6 randomized trials evaluating the use of vitamin D and calcium to prevent fractures in postmenopausal women who are not living in a nursing home or other institution, the United States Preventive Task Force (USPTF) found no evidence of a benefit from supplementation with 400 IU or less of vitamin D₃ and 1000 mg or less of calcium.

According to USPTF Recommendations 2013 statement, evidence is lacking regarding the benefit of daily supplementation with >400 IU of vitamin D₃ and >1000 mg of calcium for the primary prevention of fractures in postmenopausal women, and the balance of benefits and harms cannot be determined.^[5]

Daily supplementation with ≤400 IU of vitamin D₃ and ≤1000 mg of calcium has no net benefit for the primary prevention of fractures. Additionally, the review found evidence of an increased risk of kidney stones, with 1 in every 273 women who take these supplements for 7 years developing this problem. The recommendations are intended only for non institutionalized, asymptomatic adults without a history of fractures, and not for persons with osteoporosis or vitamin D deficiency.^[5]

The recommendation is consistent with the findings of a 2011 Institute of Medicine (IOM) report which found that most US individuals get enough calcium and vitamin D from their diet and sun exposure and that supplementation may lead to excess levels of these nutrients.^[8] Overdoses of vitamin D intake can cause vitamin D toxicity; taking in too much calcium can cause constipation, kidney stones, and other systemic problems.

Institute of Medicine (IOM) analyses regarding dietary calcium intake respected the intention-to-treat model and showed no evidence of a vitamin D dose-response relationship for fracture risk at total daily intakes above 600 to 800 IU.

IOM Committee concluded that there was insufficient evidence, particularly from randomized trials, that vitamin D treatment affected the risk of non skeletal outcomes like risk of cancer, cardiovascular disease, diabetes, infections, autoimmune disease, and other extra skeletal outcomes.

Controversies regarding supplementation of Vitamin D supplementation area were recently highlighted by a randomized controlled trial of high-dose vitamin D (a single annual dose of 500,000 IU or placebo) in elderly community-dwelling women.^[9] Surprisingly, the women receiving high-dose vitamin D had an increased risk of falls (by 15%) and fractures (by 26%).

Both the IOM and The Endocrine Society recommend calcium and vitamin D supplements to improve bone health among average-risk adults. The Endocrine Society recommends higher doses of vitamin D compared with the IOM.

Less than 3% of the general population IN United States and Canada is likely to have vitamin D needs that require levels to be higher than 20 ng/ml.

Insufficiency of research to resolve such controversies has permitted vitamin D to become “fashionable”. It is advertised on bottles of food supplements, cereals packs, has its own pro-supplement advocacy group, and generates millions in annual supplement sales.

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